

Program Endorsement Brief: 0945.00/Industrial Systems Technology and Maintenance Mechanical Engineering Technology

Los Angeles/Orange County Center of Excellence, May 2020

Summary Analysis

The Los Angeles/Orange County Center of Excellence for Labor Market Research (COE) prepared this report to provide Los Angeles/Orange County regional labor market supply and demand data related to four middle-skill occupations: *industrial engineering technicians* (17-3026), *mechanical engineering technicians* (17-3027), *industrial machinery mechanics* (49-9041), and *maintenance and repair workers, general* (49-9071). Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.¹ This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply of completers from community college programs that align with the relevant occupations.

Based on the available data there appears to be a supply gap for the mechanical engineering occupations in the region. **Therefore, the COE endorses this proposed program.** Reasons include:

Demand:

- Over the next five years, there is projected to be **6,810 jobs available annually** in the region due to new job growth and replacements, **which is more than the 360 awards conferred annually** by educational institutions in the region.
- The national-level educational attainment data indicates **between 39.0% and 53.5% of workers in the field have completed some college or an associate degree.**
- **Typical entry-level hourly wages** for occupations throughout the region are between \$14.85 and \$24.15. Entry-level wages for mechanical engineering occupations except *maintenance and repair workers, general* **are higher than the California Family Needs Calculator** hourly wage (living wage) for one adult in the region (\$15.04 in Los Angeles County and \$17.36 in Orange County).²
 - Experienced mechanical engineering occupations can expect to earn between \$26.25 and \$44.56, which is higher than the living wage estimate for both counties.

Supply:

- There are **11 community colleges** in the region that issued awards related to mechanical engineering, conferring an average of **320 awards annually** between 2016 and 2019.

¹ The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

² Living wage data was pulled from California Family Needs Calculator on 5/6/20. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>

- Between 2014 and 2017, there was an average of **40 awards conferred annually** in related training programs by non-community college institutions, all of which were generated by **2 individual four-year colleges throughout** the region.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for these four mechanical engineering occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 5% through 2024. There will be more than 6,800 job openings per year through 2024 due to job growth and replacements. Please note, the majority of job growth is due to the *maintenance and repair workers, general* occupation, which accounts for 83% of annual job openings through 2024.

This report includes employment projection data by Emsi which uses EDD information. Emsi's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy, during the projection period, will be at approximately full employment. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, it may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Therefore, the projections included in this report do not take the impacts of COVID-19 into account.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties³

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	44,590	46,674	2,084	5%	4,856
Orange	18,091	18,938	847	5%	1,955
Total	62,681	65,612	2,931	5%	6,810

Wages — Typical entry-level hourly wages for mechanical engineering positions throughout the region are between \$14.85 and \$24.15.⁴ Entry-level wages for mechanical engineering occupations, except *maintenance and repair workers, general*, are higher than the living wage for one adult in the region (\$15.04 in Los Angeles County and \$17.36 in Orange County). Experienced workers can expect to earn between \$26.25 and \$44.56, which is higher than the living wage estimates for both counties. Regional average wages are below the average statewide wage of \$23.45 for these occupations. Wage information, by county, is included in Appendix A.

Job Postings — There were 4,974 online job postings related to mechanical engineering listed in the past 12 months. The highest number of job postings were for maintenance technicians/mechanics, field service technicians, mechanics, field service engineers, and mechanical technicians. The top skills were: repair, predictive/preventative maintenance, machinery, and

³ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

⁴ Entry-level wage is defined as the twenty-fifth percentile hourly wage. Wages for experienced workers are defined as the seventy-fifth percentile hourly wage.

welding. The top three employers, by number of job postings, in the region were: Northrop Grumman, The Boeing Company, and Lockheed Martin Corporation.

It is important to note that the job postings data included in this section reflects online job postings listed in the past 12 months and does not yet demonstrate the impact of COVID-19. While employers have generally posted fewer online job postings since the beginning of the pandemic, the long-term effects are currently unknown.

Educational Attainment — The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for *industrial machinery mechanics and maintenance and repair workers, general* and an associate degree for *industrial engineering technicians and mechanical engineering technicians*. The national-level educational attainment data indicates that between 39.0% and 53.5% of workers in the field have completed some college or an associate degree. Of the 52% of mechanical engineering job postings listing a minimum education requirement in Los Angeles/Orange County, 87% (2,264) requested a high school diploma or vocational training, 9% (239) requested an associate degree, and 4% (99) requested a bachelor’s degree.

Educational Supply

Community College Supply — Exhibit 2 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Engineering Technology, General (0924.00) and Industrial Systems Technology and Maintenance (0945.00). The colleges with the most completions in the region are Pasadena and LA Trade-Tech. Over the past 12 months, there was one other related program recommendation request from a regional community college.

Exhibit 2: Regional community college awards (certificates and degrees), 2016-2019

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
0924.00	Engineering Technology, General	Cerritos	6	23	26	18
		East LA	1	-	-	0
		Glendale	12	17	14	14
		Pasadena	122	173	176	157
		LA Subtotal	141	213	216	190
		Santa Ana	5	1	1	2
		OC Subtotal	5	1	1	2
Supply Subtotal/Average			146	214	217	192
0945.00	Industrial Systems Technology and Maintenance	LA Harbor	1	1	1	1
		LA Trade-Tech	122	94	90	102
		Long Beach	1	1	-	1
		West LA	-	19	14	11
		LA Subtotal	124	115	105	115
		Fullerton	-	2	-	1

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
		Santiago Canyon	8	6	23	12
		OC Subtotal	8	8	23	13
Supply Subtotal/Average			132	123	128	128
Supply Total/Average			278	337	345	320

Non-Community College Supply — It is important to consider the supply from four-year institutions in the region that provide training programs for mechanical engineering occupations. Exhibit 3 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes: Engineering Technology, General (15.0000) and Mechanical Engineering/Mechanical Technology/Technician (15.0805). Due to different data collection periods, the most recent three-year period of available data is from 2014 to 2017. Between 2014 and 2017, four-year colleges in the region conferred an average of 40 awards annually in related training programs.

Exhibit 3: Regional non-community college awards, 2014-2017

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
15.0000	Engineering Technology, General	California State Polytechnic University-Pomona	26	42	11	26
		California State University-Long Beach	1	-	-	0
Supply Subtotal/Average			27	42	11	27
15.0805	Mechanical Engineering/Mechanical Technology/Technician	California State Polytechnic University-Pomona	-	-	41	14
Supply Subtotal/Average			-	-	41	14
Supply Total/Average			27	42	52	40

Appendix A: Occupational demand and wage data by county

Exhibit 4. Los Angeles County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Maintenance and Repair Workers, General (49-9071)	36,239	38,517	2,278	6%	4,079	\$14.72	\$19.27	\$26.02
Industrial Machinery Mechanics (49-9041)	6,308	6,153	(155)	(2%)	574	\$19.27	\$25.04	\$32.15
Industrial Engineering Technicians (17-3026)	1,038	1,025	(13)	(1%)	103	\$23.77	\$34.47	\$44.54
Mechanical Engineering Technicians (17-3027)	1,005	979	(26)	(3%)	99	\$22.58	\$29.94	\$37.28
Total	44,590	46,674	2,084	5%	4,856	-	-	-

Exhibit 5. Orange County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Maintenance and Repair Workers, General (49-9071)	14,398	15,194	796	6%	1,595	\$15.19	\$19.89	\$26.84
Industrial Machinery Mechanics (49-9041)	2,532	2,568	36	1%	243	\$20.01	\$25.97	\$33.33
Industrial Engineering Technicians (17-3026)	600	609	9	2%	61	\$24.80	\$35.15	\$44.61
Mechanical Engineering Technicians (17-3027)	561	568	7	1%	57	\$23.24	\$30.41	\$37.51
Total	18,091	18,938	847	5%	1,955	-	-	-

Exhibit 6. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Maintenance and Repair Workers, General (49-9071)	50,637	53,710	3,073	6%	5,674	\$14.85	\$19.45	\$26.25
Industrial Machinery Mechanics (49-9041)	8,839	8,721	(118)	(1%)	817	\$19.47	\$25.31	\$32.50
Industrial Engineering Technicians (17-3026)	1,638	1,634	(4)	(0%)	164	\$24.15	\$34.72	\$44.56
Mechanical Engineering Technicians (17-3027)	1,566	1,546	(20)	(1%)	156	\$22.81	\$30.11	\$37.37
Total	62,681	65,612	2,931	5%	6,810	-	-	-

Appendix B: Sources

- O*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- Employment Development Department, Labor Market Information Division, OES
- Employment Development Department, Unemployment Insurance Dataset
- Living Insight Center for Community Economic Development
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- California Family Needs Calculator, Insight Center for Community Economic Development
- Chancellor's Office Curriculum Inventory (COCI 2.0)

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